MARINE ALGAE OF INHACA ISLAND AND OF THE INHACA PENINSULA. I.

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(With Plates XXXVI—XLIII)

INTRODUCTION

The algae listed in this paper were collected at the end of June and in July 1954 and in July 1956 while the author stayed at the Estação de Biologia Maritima on the island of Inhaca in Delagoa Bay. Algae were collected on the coasts of the island, which lies about twenty miles east of Lourenço Marques, and also at Santa Maria and Ponta Abril on the east coast of the Inhaca Peninsula—a peninsula of the mainland of Portuguese East Africa which extends northwards on the eastern side of Delagoa Bay (Fig. 1). This peninsula is separated from the southern end of Inhaca Island by a narrow strait which at its narrowest at low water spring tides, is about a hundred yards across (Kalk, 1954).

The author's chief immediate interest in the seaweeds of Portuguese East Africa is to obtain data relating to the distribution of South African seaweeds to the north of the Union of South Africa on the east coast. There are no published lists or monographs of the seaweeds of Portuguese East Africa and so these records should prove of general interest to students of seaweed distribution. Most of the species dealt with in this paper occur also on the Union coasts.

A general account of the island and a preliminary account of its marine animal communities has been published by Kalk (1954) and her paper has been much used in writing the general comments which follow.

Inhaca Island and Peninsula provide a wide range of marine habitats —rocky coast, sand, mud flats, old coral reef material scattered over sand, and patches of living coral reef off the West Coast of the island. The patches of reef are the most southerly on the east coast of Africa. They are rarely completely uncovered by the sea. The most varied and densest seaweed growth occurs on rocky coasts although individuals of certain species, such as *Padina commersonii* and *Udotea orientalis*, attain their maximum luxuriance attached in sand in quiet waters. In places on rocky coasts the algae form mixed communities, the plants sometimes forming turfs in the sense of a dense growth of small plants, the upper

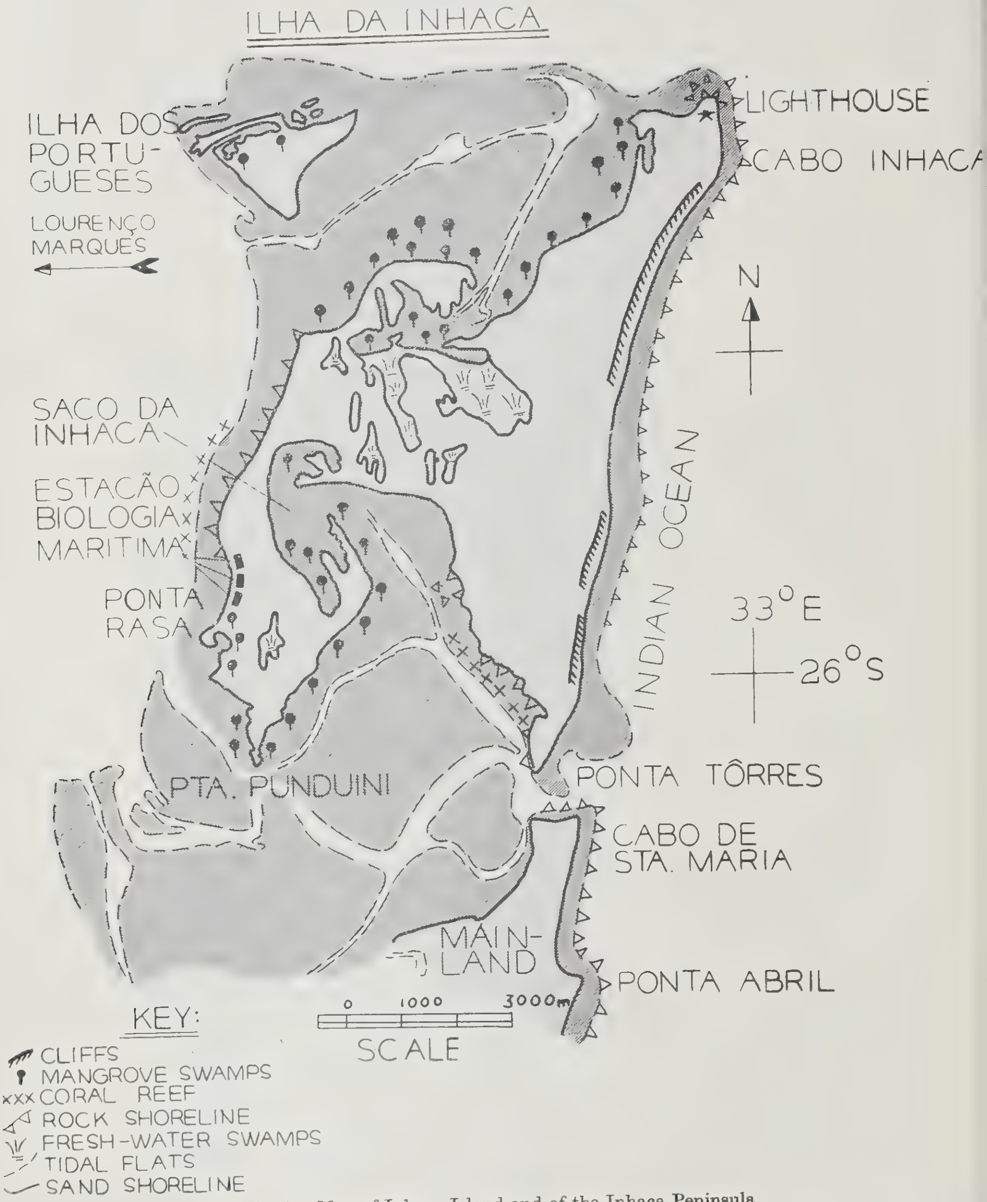

Fig. 1.—Map of Inhaca Island and of the Inhaca Peninsula.

Based on amended version by H. B. S. Cooke of map prepared by the Missão Hidrografica da Colonia de Moçambi surface of the community being of a more or less even height. Locally, certain seaweeds form more or less pure communities of greater or lesser extent. At the lowest intertidal levels *Sargassum* forms such communities; on rock platforms communities dominated by *Padina commersonii* occur; and on vertical rock faces at low intertidal levels very local dense growths of *Chamaedoris delphinii* and *Pseudocodium de-vriesei* may be observed. There is reason to believe that there is a more luxuriant growth of marine algae during the summer months. Marine angiosperms are a prominent feature of the region. Extensive mangrove swamps occur, especially at the northern end of the island and in the deep bay or Saco at the southern end. The four dominant mangrove species are *Avicennia officinalis* Linn., *Ceriops candolleana* Arn., *Bruguiera cylindrica* Blum, and *Rhizophora mucronata* Lam. (Mogg, 1956). *Avicennia* is the most prominent plant along the shoreward edge where its presence is made very evident by the numerous branch roots growing upright through the mud. *Ceriops* and *Bruguiera* are more characteristic of the muddy interior while *Rhizophora*, spectacular on account of its prominent stilt roots, occurs along the banks of the channels running into the mangroves. These mangroves are not estuarine in the sense of being at the mouths of rivers as no rivers flow out to sea from Inhaca. As in true estuaries, however, marked salinity variations occur in these mangroves due to the drainage of water from high lands (especially after rain) and to evaporation following spring tides (Kalk, 1954). A limited number of algae occur in the mangroves including *Bostrychia binderi*. To seaward of the southern mangrove an abundance of *Acetabularia calyculus* occurs attached to the empty half shells of the bivalve *Loriphes clausus* which in places cover a sand and mud substratum in shallow water. There is also on the island coasts an abundance of "sea grasses": *Cymodocea ciliata* (Forsk.) Ehrenb., *C. isoetifolia* Aschers., *C. rotundata* Aschers and Schweinf., *C. serrulata* (R. Br.) Aschers and Agnus, *Diplanthera uninervis* (Forsk.) F. N. Williams, *Halophila ovalis* (R. Br.) Hook, *Halophila* sp., and *Thalassia hemprichii* (Ehrenb.) Aschers. (Moss, 1937, Cohen, 1939, Mogg, 1956). *Diplanthera uninervis* is uncovered at low water neaps or is left by the sea in very shallow water. *Cymodocea rotundata* and *C. serrulata* are uncovered or left in shallow water at low water of springs. *Cymodocea ciliata* is mostly permanently submerged but it is sometimes uncovered during spring tides at the lowest intertidal levels as at the north east end of the island. Typically all these species, as is reported to be the case with "sea grasses" in general, occur rooted in sand in relatively quiet waters. On the east coast of Inhaca island *Cymodocea ciliata* occurs attached to rock (including rock pools) in situations where it is subjected to a fair amount of buffeting by the waves but it is more abundant in the waters off the west coast of the island where it grows rooted in sand.

The extreme tidal range for the coasts of this region is 3·3 m., taking the mean low water level of spring tides as zero while the range for mean high water of spring tides is 3·0 m. (Kalk, 1954). This is wider than for the Union coasts which have a maximum range of less than 2·0 m.—5·6 ft. (Bauer, 1933).

From latitude 11° S. the coastal waters off the east coast of Southern Africa are subjected to the influence of the warm Agulhas Current (Isaac, 1937). Temperatures in general increase northwards along the east coast and although sea temperature data are meagre it is clear that the coastal waters have a higher temperature at Inhaca than off the Natal coast since the number of tropical and sub-tropical genera of marine algae is greater and "sea grasses" are prominent. The occurrence on the west coast of Inhaca of patches of living coral reef is further corroborative evidence. The east coast of the island is exposed directly to the waters of the Indian Ocean while the waters off the west coast of Inhaca are shallow and protected by Delagoa Bay. These waters are further protected by sandy shoals to the south and to the north, the northern shoal surrounding the smaller Ilha dos Portuguêses (Fig. 1). Although the effects of relative isolation of the waters off the west coast of Inhaca are modified by currents of water which flow into this region from the open sea it is not surprising that higher sea temperatures should prevail in the waters off the west coast than in the waters off the east coast. The east coast is subject to heavier wave action and the salinity of the open sea here and elsewhere is 35·47 $^0/_{00}$. The tidal waters of the west coast have a salinity of 30 to 33·9 $^0/_{00}$. (Kalk, 1954). At least three interacting factors affect the salinity of west coast waters: (*a*) The inflow of fresh water from large rivers flowing into Delagoa Bay. (*b*) The drainage of fresh water into the intertidal region just below the mean high water level of neap tides. (*c*) An inflow off the west coast of water from the open sea. The position of the drainage line of fresh water on to the shores of Inhaca Island and on to the east shore of Inhaca Peninsula is marked by the flourishing appearing and disappearing green colonies of semi-microscopic turbellarian worms of the *Convoluta roscoffensis* type, the green colour of which is due to the large numbers of symbiotic microscopic algae living in their tissues. (For a note on the identity of this organism see Marcus and Macnae, 1954). The drainage of fresh water into the deeper, more turbulent sea off the east coast is of less significance than drainage into the shallow, quiet waters off the west coast.

LIST OF SPECIES

In arranging Chlorophyceae, Fritsch's classification (1935) has been adopted except in the case of siphonous Chlorophyceae where the classification of Egerod (1952) has been followed. Kylin's classification has been used for the Phaeophyta (1933) and for the Florideae (1937).

Abbreviated citations to literature are given for each species. Full details are listed under literature cited. Citations included within brackets have not been seen.

Where, in the majority of cases, no authority is quoted for the distribution of a species on the coasts of the Union of South Africa, the author has himself collected the species for the range indicated.

CHLOROPHYCEAE

ULOTRICHALES

Ulva rigida C. Ag.

J. G. Agardh: *Till Alg. Syst.* III, p. 168.

Levring: "Chlorophyceen u. Phaeophyceen von Südafrika", p. 3., Fig. 1 (sections and surface view).

Feldmann: "Les Algues Marines de la Côte des Albères", p. 56.

Sub-nom, *U. lactuca* L. var. *rigida* Le Jol.

Le Jolis: "Algues marines de Cherbourg", p. 38.

Santa Maria, Ponta Abril, Lighthouse Rocks of Inhaca Island[1].

This species has somewhat elongated cells as seen in transverse section (Fig. 2) and also a short fleshy stipe. The plants collected were about 1½—2 cms. high and up to about 2 cms. broad. The frond is rigid when the plant is taken out of the water.

Ulva rigida occurs at the lowest intertidal levels and especially at lower mid-tidal levels. It is frequently fairly common on the tube colonies of *Idanthyrsus pennatus*, a Sabellarid worm.

The species is widely distributed on the east and south coasts of the Union.

SIPHONALES

Caulerpa cupressoides (Vahl) C. Ag., Weber van Bosse emend.

Sub-nom.

Fucus cupressoides (Vahl: Endeel Cryptogamiske Planter fra St. Croix).

Caulerpa cupressoides. C. A. Agardh: *Spec. Algarum*, Vol. 1. p. 441.

Weber van Bosse: *Des Caulerpes*, p. 323, Pl. 27. (Figs. 1—14), Pl. 28 (Figs. 1—12)

Ponta Abril, Santa Maria, Lighthouse Rocks, west coast of Inhaca Island.

As is evident from Weber van Bosse's monograph this is a very variable species. Inhaca material from Ponta Abril (B. 229) is illustrated

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[1] Subsequently referred to as Lighthouse Rocks.

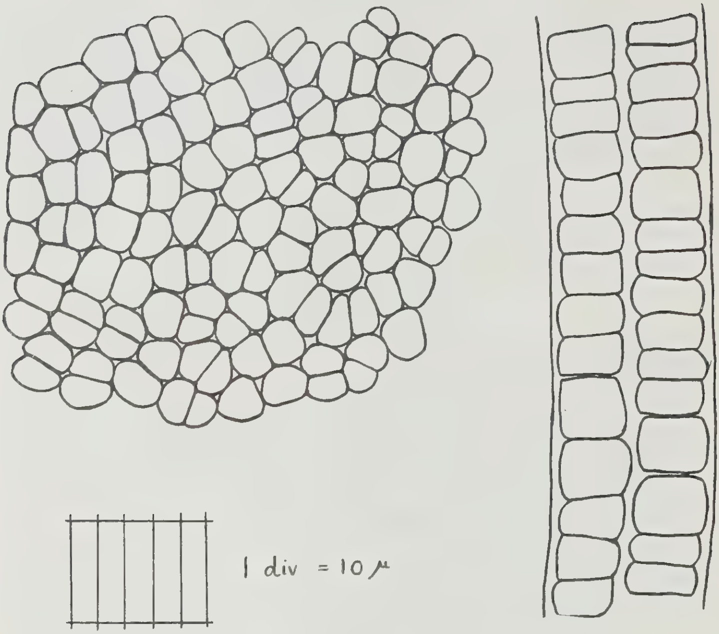

Fig. 2.—*Ulva rigida* C. Ag. (Santa Maria: Isaac 624). Surface view and transverse section.

in Fig. 3. It will be observed that the branching fronds bear numerous small pinnae. These pinnae are closely crowded together over the distal parts of the fronds where they are regularly arranged in 3 or 4 rows.

The material examined agrees reasonably well with *C. cupressoides* (Vahl) C. Ag. var. *lycopodium* (Ag), W. v. B., *f. amicorum* (Harv.), W. v. B.

Caulerpa racemosa (Forssk) Weber van Bosse var. *clavifera* (Turn) W. v. B. f. *macrophysa*. (Kütz) W. v. B.,
Sub-nom. *Fucus racemosus*
(Forsskål: *Flora Ægyptiaco-Arabica*, p. 191.)
Weber van Bosse: *Des Caulerpes*, p. 357, Plate 33, Fig. 4.
Lighthouse Rocks, Santa Maria, Ponta Abril.

Plants of f. *macrophysa* of var. *clavifera* of this variable species are illustrated in Plate XXXVI A. A common variant of this form is shown in Fig. 4: the pinnae are more or less pyriform and characteristically

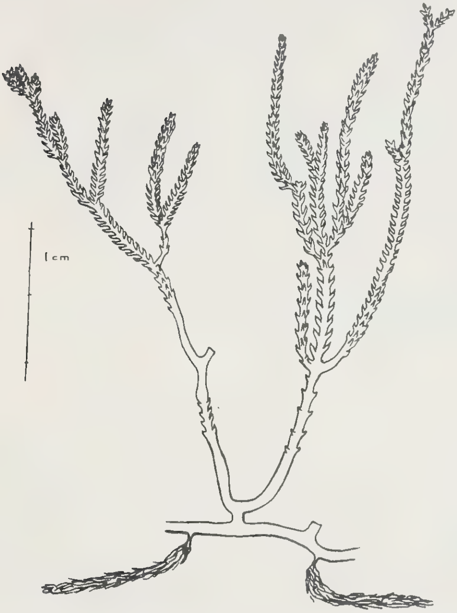

Fig. 3.—*Caulerpa cupressoides* (Vahl) C. Ag. (Ponta Abril: B. 229)

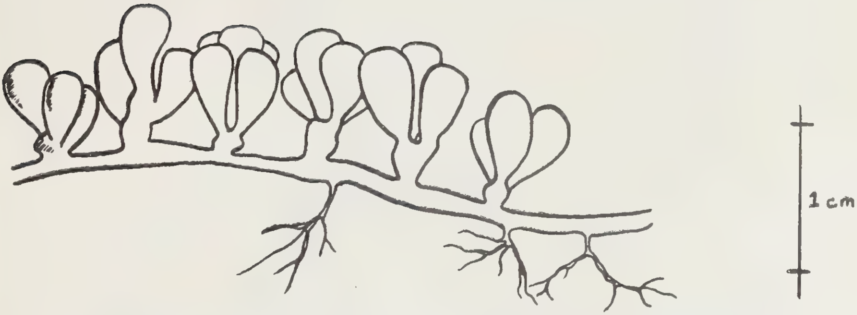

Fig. 4.—Variant of *Caulerpa racemosa* (Forssk) W. v. B., var. *clavifera* (Turn.) W. v. B., f. *macrophysa* (Lighthouse Rocks).

occur in small clumps, the bases of the pinnae arising very close to one another giving the clumps a characteristic congested candelabra-like appearance. In these plants each frond resembles the right hand frond depicted by Weber van Bosse in Fig. 4, Plate 33 of her monograph on the Caulerpas.

These plants grow at the lowest intertidal levels.

I have identified var. *clavifera* f. *macrophysa* of the type illustrated in Fig. 4, from material collected by Mr. G. M. Thomson at Isipingo where it occurs as a rare plant. In the Inhaca region it is a common plant.

Caulerpa scalpelliformis (R. Br.) C. Ag.

Sub-nom:

Fucus scalpelliformis

R. Brown in Turner: *Hist. Fuc.* Vol. 3, p. 96, Plate 174.

Caulerpa scalpelliformis

C. A. Agardh: *Spec. Algarum*, Vol. 1, p. 437.

Weber van Bosse: *Des Caulerpes*, p. 286, Pl. 22 (Fig. 11), Pl. 23, (Figs. 1—10).

C. *denticulata*. (Decaisne, *Arch. du Mus.* II, pl. 6, Fig. 1).

Ponta Abril, Santa Maria, Lighthouse Rocks.

The plants examined were of var. *denticulata* (Decaisne) W. v. B. and var. *intermedia* W. v. B. (Fig. 5).

C. *scalpelliformis* is a common and widely distributed species of the Inhaca region. Small plants occur as a turf constituent on rocky shores and large sized plants are found growing on sand in quiet waters.

C. *scalpelliformis* var. *intermedia* has been recorded for the north coast of Natal at St. Lucia rocks in St. Lucia Bay by Papenfuss who also calls attention to material of the plant collected in Delagoa Bay by Moe in 1903 (Papenfuss, 1943).

Caulerpa selago (Turn.), C. Ag.

Sub-nom:

Fucus selago

Turner: *Fuci* 1, p. 122, pl. 55.

Caulerpa selago

C. A. Agardh: *Species Algarum*, Vol. I, p. 442.

Weber van Bosse: *Des Caulerpes*, p. 296.

Ponta Abril, Santa Maria, Lighthouse Rocks.

A common plant at Inhaca (Fig. 6). A constituent species of algal turf.

The species was recorded for the Union coast by Pocock and Papenfuss who collected it in northern Natal near the mouth of the St. Lucia estuary (Papenfuss, 1951).

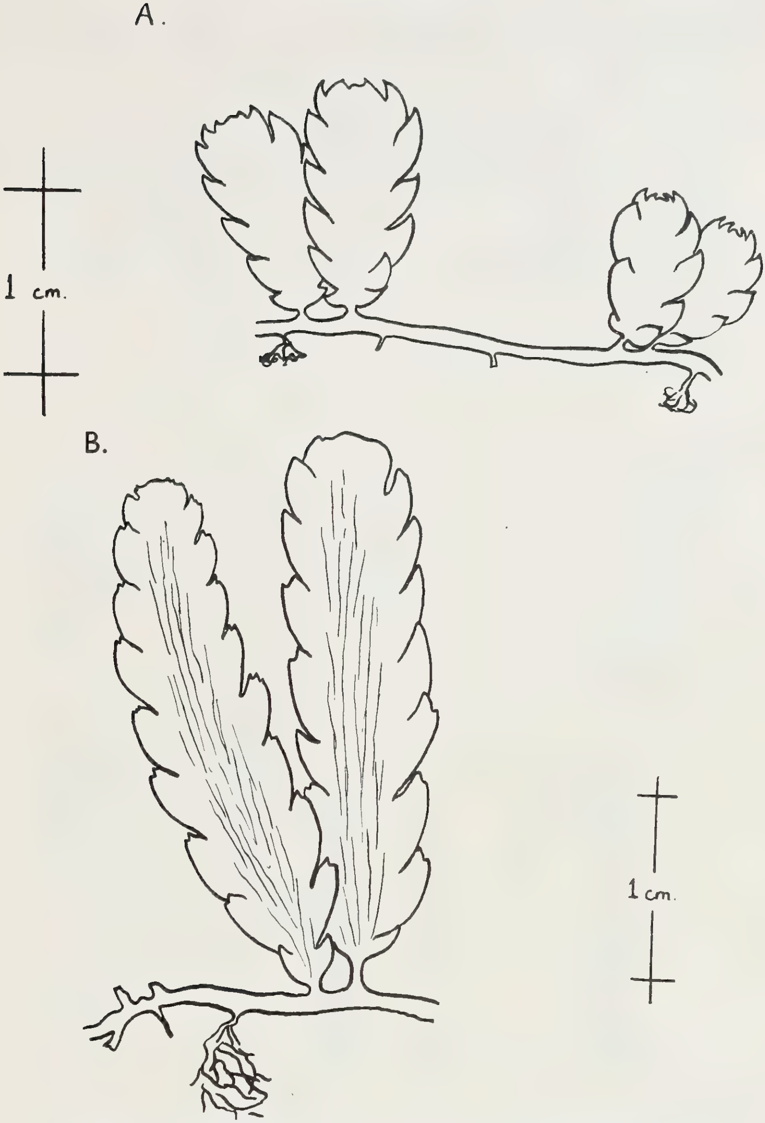

Fig. 5.—*Caulerpa scalpelliformis* (R. Br.) C. Ag. A. var. *intermedia* W. v. B. (Young plant) B. var. *denticulata* (Decaisne) W. v. B. (B. 232).

Halimeda cuneata Hering.

(Hering: *Flora*, vol. 29, p. 214).

Kützing: *Species Algarum*, p. 505.

Kützing: *Tab. Phyc.*, vol. 7, p. 8, pl. 21, Fig. 3.

E. S. Barton: *Halimeda*, p. 15, pl. 1, Fig. 7.

Santa Maria, Ponta Abril, Lighthouse Rocks.

This is a widespread species (Plate XXXVI B) at Inhaca. It shows much variation in size. On vertical rock faces at low water level it is sometimes very abundant.

Halimeda cuneata is widely distributed on the eastern and south eastern coasts of the Union.

Pseudocodium de-vriesei W. v. B.

Weber van Bosse: *J. Linn. Soc. Bot.*, vol. 32, p. 209.

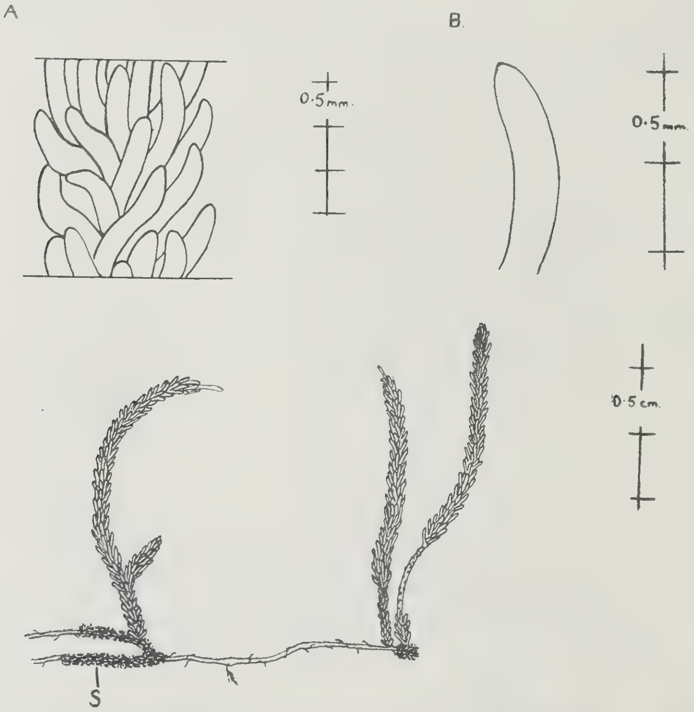

Fig. 6.—Below, *Caulerpa selago* (Turn.) C. Ag. (B. 279) S-rhizoids covered with sand.
A. Portion of frond magnified to show arrangement of pinnules.
B. Single pinnule.

Levring: "Chlorophyceen u. Phæophyceen von Südafrika", p. 14, pl. 4, Fig. 10.

Ponta Abril, Santa Maria, Lighthouse Rocks.

This is a widespread species. In places it is a very common to dominant species on vertical rock faces at low intertidal levels.

The type locality of this species is in the vicinity of Durban (rocks near Isipingo[1] and the Bluff near Durban—Weber van Bosse, 1896). It is widely distributed on the east coast of the Union where it may be a prominent species locally. The Union plants are frequently larger than those of Inhaca Island and Peninsula.

As far as I am aware this is the first record of the species outside of the Union of South Africa.

Udotea orientalis A. and E. S. Gepp.

A. and E. S. Gepp: *The Codiaceae of the Siboga Expedition* p. 119.

Sand Bank off Ponta Rasa, Ponta Punduini, Santa Maria, Ponta Abril, Lighthouse Rocks, west coast near Marine Station.

Inhaca material of this species agrees well with the description of A. and E. S. Gepp (1911). As Plate XXXVII shows the frond is well developed and broad. The frond filaments (Fig. 7) show constrictions at markedly unequal distances above the points of dichotomy, which feature is characteristic of this species.

The frond varies in breadth, and the plant in size, according to habitat conditions. The plants growing in quiet sandy pools and in sand in quiet waters behind the old coral reef at Ponta Punduini are large (up to 5 cm. and more in height) and have broad (up to 6 cm.) fronds. In shallow sandy pools *Udotea orientalis* was found growing associated with *Padina commersonii* and with the Angiosperm *Halophila ovalis*. Plants growing in rougher seas on sand and on vertical rock faces are smaller and often have narrower fronds.

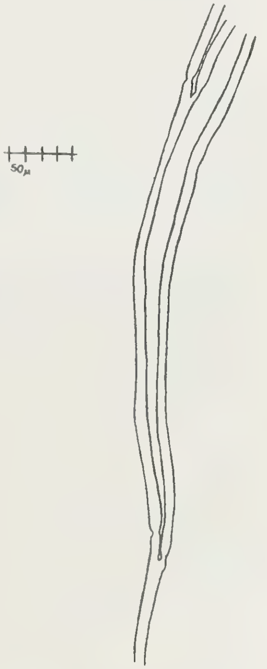

Fig. 7.—Branching strand from the frond of *Udotea orientalis* A. and E. S. Gepp. (B. 93).

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[1] Recorded as "Isipinga" by Weber van Bosse.

Udotea orientalis occurs on the coast of Natal. The South African plants taken as a whole are smaller than those of Inhaca and have narrower fronds. The former not infrequently have an external appearance which recalls *U. indica* A. and E. S. Gepp but the frond filaments lack the simple appendages characteristic of that species.

SIPHONOCLADALES

Chamaedoris delphinii (Hariot) Feldm. et Börg.
Sub-nom:
Siphonocladus delphinii.
(Hariot: Quelques Algues de Madagascar, p. 470.)
Chamaedoris delphinii.
(Feldmann: *Rev. Général de Bot.* v. 50, p. 18)
Börgesen: *Some Marine Algae from Mauritius I.* p. 16, Plate 1.
Santa Maria, Ponta Abril, Lighthouse Rocks.

A very common plant (Plate XXXVIII) at Inhaca. It forms societies and clans in rock pools and on vertical rock faces at low intertidal levels.

This species occurs on the coast of Natal and on the east coast of the Cape Province. It is locally common in some places as at Isipingo (about eleven miles south of Durban) and Chaka's Rock about 30 miles north of Durban. It was nowhere observed to be as common on the Union coast as on the coasts of the Inhaca region.

Microdictyon krausii J. E. Gray.
Gray: *Jour. Bot.* (Seemann's) v. 4, p. 69
Setchell: *The Genus Microdictyon*, p. 519.
Ponta Abril, Lighthouse Rocks.

The outline of a plant collected at Ponta Abril is shown in Fig. 8a, and in b. a portion of the network towards the base is illustrated showing the long basal segments. The material studied agrees well with the description of the species given by Setchell (1929) and in structure it agrees with material of *Microdictyon* collected on the coasts of Natal.

It grows in somewhat shaded situations and is common on vertical sides of deep pools especially pools at low intertidal levels. At a quick glance it appears *in situ* somewhat like a large *Ulva rigida* due to its general form and bright green colour but a more careful observation will detect a certain opacity to its colour. Although when fresh the plant is a bright green colour it soon darkens to a grey-green in preservative and on a herbarium sheet.

Microdictyon krausii is a rare plant of the intertidal region on the coast of Natal. The type locality is near Durban. It has not previously been recorded outside the Union.

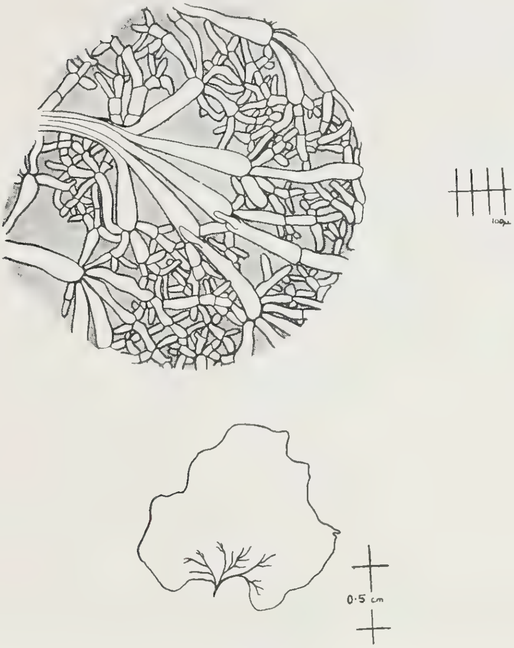

Fig. 8.—*Microdictyon krausii* J. E. Gray, (Ponta Abril B. 250). Below, frond—outline. Above, detail of portion of basal part of frond.

Valonia macrophysa Kütz.

Kütz: *Phycologia Generalis*, p. 307.

Kütz: *Tab. Phyc.*, vol. 6, p. 30, pl. 87, Fig. 3.

Sand beach and coral reef on west coast of island, Lighthouse Rocks, Santa Maria, Ponta Abril.

Valonia macrophysa is a widespread species in the Inhaca region. It occurs in rock pools with zoanthids; as a constituent of algal turf; and is common on vertical rock faces and underneath low level overhangs at low intertidal levels.

This species occurs on the east coast of the Union where in places at Isipingo it dominates rock faces at low intertidal levels.

DASYCLADALES

Acetabularia calyculus Quoy et Gaimard.

(Quoy et P. Gaimard: *Voyage autour du Monde*, p. 621)

Harvey: *Phycologia Australica*, vol. 5, Plate 249.

Solms-Laubach: Monograph of the Acetabularieae, p. 26.

Börgesen: Marine Algae of the Danish West Indies 1, p. 75. (The specific epithet is spelt "caliculus" by Börgesen.)

At southern end of Inhaca Island: Saco.

The mature plants collected were about 2—3 cms. high.

Each stalk terminates in a basin-like "disc", the whole plant resembling somewhat a long stalked glass. The larger "discs" are 4 mm. in diameter. The number of rays in a disc varied from 18 to 32 in the plants examined but the number was usually about 20. The rings of sterile filaments were occasionally present in the material examined but mostly they had fallen off leaving scars.

The rays of the "disc" are strongly upcurved, the apices being broadly rounded, or having a central indentation or apiculum (Fig. 9). The rays are either free from one another or laterally closely adherent. Thus the material named *A. calyculus* here corresponds to the more inclusive description by Börgesen rather than to the *A. calyculus* which is demarcated from *A. suhrii* by Solms-Laubach. Börgesen does not think it possible to regard *A. suhrii* as a species. (1913, p. 80).

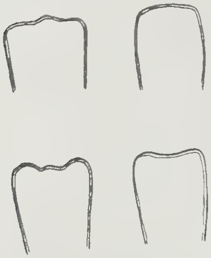

Fig. 9.—Apices of rays of *Acetabularia calyculus* Quoy et Gaimard. (Saco: B. 276A)

The superior and inferior coronal segments are free from one another (Fig. 10). The sterile hair scars on the superior coronal segments were not easily visible but there appeared to be two or three when the segment was seen in side view.

The fully mature rays contained numerous globular swarmer cysts. The size of the swarmer cysts varied much even sometimes in different rays of the same disc.

Although the plants of *Acetabularia* examined varied in regard to number of rays in a disc, the form of the apex of the rays, the lateral adherence or non-adherence of the rays, and the size and number of swarmer cysts, they all agreed in regard to the following characters:—

1. Order of size: 2—3 cms.
2. Strongly upcurved rays.
3. Relatively small number of rays per disc.
4. Presence of both superior and inferior coronal segments.
5. Coronal segments free from one another.
6. Spherical swarmer cysts.

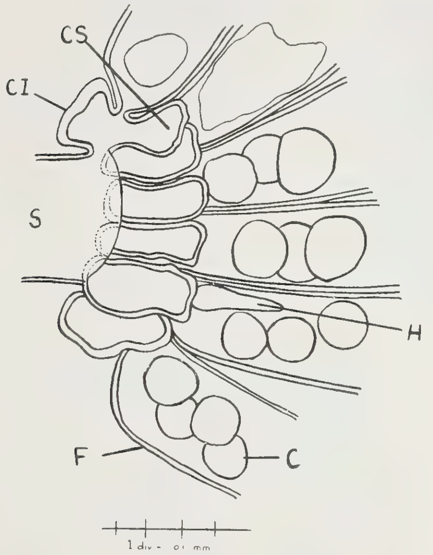

Fig. 10.—Portion of disc of *Acetabularia calyculus* Quoy et Gaimard (B. 276 A.) S = Axis. C.I. = Corona inferior. C.S. = Corona superior. H = Sterile hair. F. = Fertile ray. C. = Spore Cyst.

In rays where the swarmer cysts had not been formed, chloroplasts occurred only along the upper and lower surfaces and at the apex of the rays; they were absent from the sides.

As stated in the introductory section, *Acetabularia calyculus* was found to seaward of the southern mangrove growing attached to shells of *Loriphes clausus*. It was of local occurrence but it was abundant where it occurred.

Neomeris dumetosa Lamour.

(Lamouroux: *Histoire des Polypiers coralligènes flexibles*, p. 243).

Howe: *Bull. Torrey. Bot. Club.*, vol. 36, p. 77.

Lighthouse Rocks, Santa Maria, Ponta Abril.

The material examined agrees with Howe's description of the species.

This is a common and widely spread species in rock pools, at the lower intertidal levels on vertical rock surfaces, and as an algal turf constituent.

PHAEOPHYTA

ECTOCARPALES

Ralfsia expansa J. Ag.

J. G. Agardh: *Spec. Gen. et Ord. Algarum*, vol. 1, p. 63.

Börgesen: "Two crustaceous algae from the Danish West Indies", p. 123.

Ponta Abril, Lighthouse Rocks.

Ralfsia is widely distributed on the rocky shores of the Inhaca region.

In section, the material examined showed marked symmetry (Fig. 11) in places, but symmetry in the disposition of filaments was barely

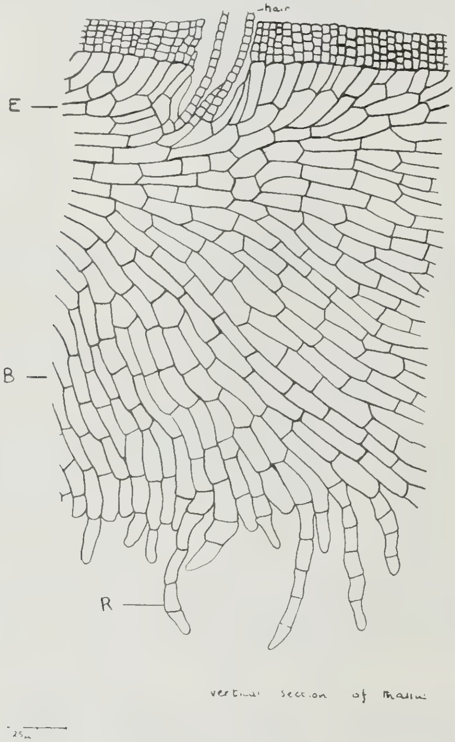

Fig. 11.—Vertical section of *Ralfsia expansa* J. Ag. (Ponta Abril). E. = erect filaments. B. = basal filaments. R. = rhizoid.

discernible in other parts. This is characteristic of *R. expansa* while in *R. deusta* bilateral symmetry is always clearly seen (Weber van Bosse, 1913, p. 146).

Mature reproductive organs were not seen in the sections examined but an early stage in the development of a sporangial sorus was observed (Fig. 12).

R. expansa is generally distributed over South African coasts being a species of both warm and cold South African waters. In earlier publications dealing with the biota of South African coasts this species is referred to as *Lepadoderma africanum* Dickinson. This name, however, was not validated.

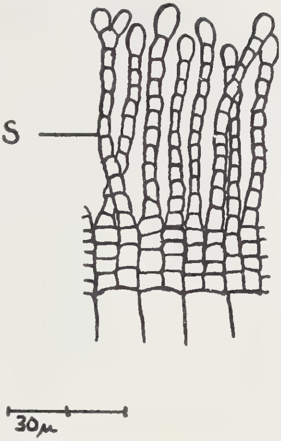

Fig. 12.—Early developmental stage of a sporangial sorus of *Ralfsia expansa* J. Ag. S. = sterile filament.

DICTYOTALES

Dictyopteris longifolia Papenfuss ined.
Ponta Abril, Lighthouse Rocks.

Plants of *Dictyopteris* were collected on Inhaca Island and Peninsula which closely resemble plants of a species of *Dictyopteris* found growing on the east and south eastern coasts of the Union (Plate XXXIX). This species corresponds to *Haliseris dichotoma* (Suhr) Kütz depicted by Kützing in *Tabulae Phycologicae*, IX, Tab. 57 (i) and with material in the Botany Department Cape Town University named *Dictyopteris dichotoma* (Suhr) Levring by Papenfuss. The change in nomenclature from *Haliseris dichotoma* Suhr to *Dictyopteris dichotoma* (Suhr) Levring was made by Levring (1938). Stephenson (1947) makes the following comment in regard to *Dictyopteris dichotoma* (Suhr) Levring: "The common plant which has long been known as *dichotoma* is not in fact Suhr's species, one of whose specimens has been examined by Papenfuss; who is accordingly re-naming the common form *longifolia*". (p. 298)

Dictyopteris longifolia in the Inhaca region grows at low intertidal levels in rock pools and shallow water.

Padina commersonii Bory.

(Bory: *Voyage de la Coquille, Botanique*, p. 144).
J. G. Agardh: *Till Algernes Syst.*, II p. 119.
Weber van Bosse: *Des Algues du Siboga.*, I p. 178.
Taylor: *Plants of Bikini*, p. 100, Plate 54, Fig. 1.

Santa Maria, Sandbank off Ponta Punduini, Ponta Abril, Lighthouse Rocks.

Fertile material was collected both at Santa Maria and Ponta Punduini. The relative arrangement of zones of hairs and of organs of fructification is as illustrated by Weber van Bosse (Fig. 51, p. 179, 1913) and is shown in Fig. 13.

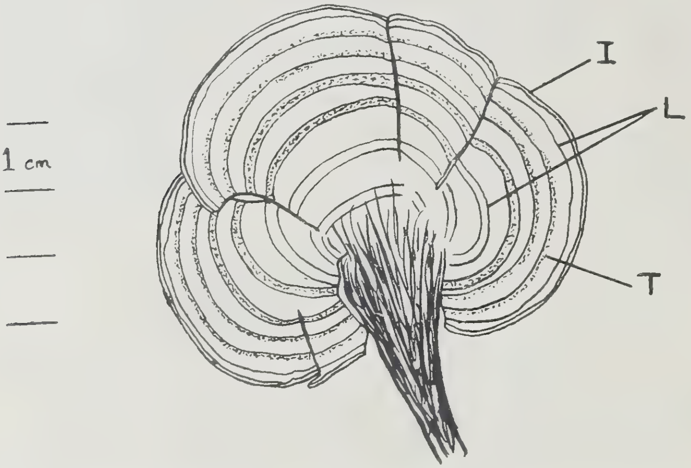

Fig. 13.—*Padina commersonii* Bory. (Sand bank off Ponta Punduini: Isaac 185). Tetrasporangial plant. I. = inrolled edge. L. = line of hairs. T. = tetrasporangia.

This plant was found growing in a variety of habitats: on sand to landward of a dense growth of *Cymodocea ciliata;* on old broken coral scattered over the sandbank near Ponta Punduini; rock pools; widely distributed on rocky shores especially on rocky platforms in small, water-filled, shallow depressions and permanently submerged in shallow water. On rocky platforms the plant occurs as a dominant species forming almost pure communities. Here, however, and on rocky shores in general the plant is much smaller than on sand and on broken coral scattered on sand in quiet waters (Plate XL). Also the smaller plants have a denser incrustation of lime.

The species is widely distributed on the coast of Natal and on the east coast of the Cape Province north of East London. Nowhere on the Union coast, however, has it been found in such profusion as on the rocky platforms of the Inhaca region.

Pocockiella variegata (Lamour) Papenfuss.

(Lamouroux: Observations sur la physiologie des algues marines, p. 331)

Papenfuss: *Amer. Jour. Bot.*, vol. 30, p. 467, Fig. 1—14.
Ponta Abril.

The specimens examined agree essentially with Papenfuss' description of the species. Some of the plants collected were somewhat larger than the plants illustrated by Papenfuss and the number of cortical cells (Fig. 14a and b) somewhat greater. The plants, however, are smaller and the number of cortical cells decidedly fewer than in *P. papenfussii* Taylor (1950). No fertile material was examined.

Pocockiella variegata is recorded over the entire length of the Natal coast (Stephenson, 1947).

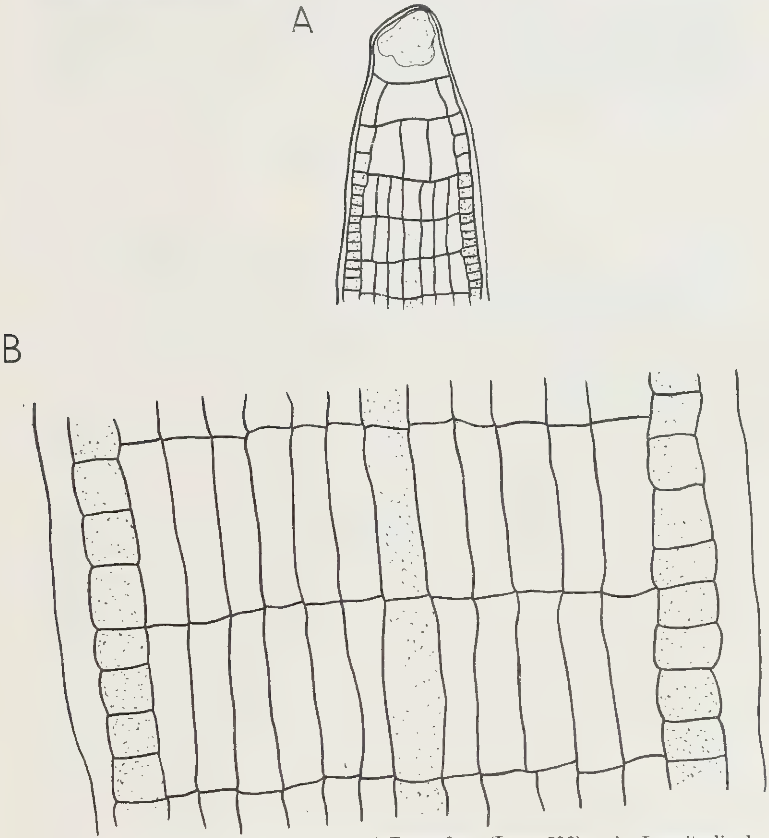

Fig. 14.—*Pocockiella variegata* (Lamour.) Papenfuss. (Isaac 536). A. Longitudinal section of Apex × 160. B. Longitudinal section of mature thallus × 850. (A. reduced to half and B., reduced to one third.)

Stypopodium zonale (Lamour) Papenfuss.

Sub-nom.

Fucus zonalis (Lamouroux: *Dissertations sur Plusieurs Espèces de Fucus*).

Papenfuss: *Bot. Notiser*, 1940, p. 205.

Lighthouse Rocks, Ponta Abril.

This is a very variable species in regard to form, colour and thickness. The range of forms collected at Inhaca (Plate XLI) falls within the wide range of forms at the British Museum of Natural History, determined as *Stypopodium zonale* (Lamour) Papenfuss by Papenfuss. The Museum material had been previously named *Stypopodium lobatum* (Ag.) Kütz.

In the Inhaca region this species occurs in rock pools and in the upper sub-littoral. It is a fairly common species on the east coast of the island on rocks in the neighbourhood of the lighthouse.

Stypopodium zonale is distributed on the east and south coasts of the Union.

PUNCTARIALES

Chnoospora minima (Hering) Papenfuss.

Sub-nom.

Fucus minimus Hering: *Ann. Mag. Nat. Hist.*, vol. 8, p. 92

Chnoospora fastigiata var. *pacifica.*

J. G. Agardh: *Spec., Gen.* et *Ord. Algarum* vol. 1, p. 172.

Chnoospora pacifica

Kütz: *Tab. Phyc.*, vol. 9, p. 36, pl. 86, Fig. 1.

Levring: "Chlorophyceen u. Phaeophyceen von Südafrika", p. 21, Fig. 10 (sections), Plate 4, Fig. 12.

Santa Maria, Ponta Abril, Lighthouse Rocks.

A comparison of the form and structure of Inhaca and Natal plants indicates that they belong to the same species. Material from Isipingo near Durban has been described by Levring (1938).

This species has previously been known in South Africa as *Chnoospora pacifica* J. Ag. Papenfuss (1956, p. 69) points out that since the plant was first described by Hering under the name of *Fucus minimus* the later name *C. pacifica* J. Ag. should be changed to *C. minima* (Her.) Papenfuss.

Chnoospora minima occurs on the coast of Natal and on the east coast of the Cape Province. Although not a common plant, it was found widespread on the coasts of the Inhaca region.

Colpomenia sinuosa (Roth) Derb., et Sol.

Sub-nom.

Ulva sinuosa (Roth: *Catal. Bot.* vol. 3, p. 327, Pl. 12)

Colpomenia sinuosa (Derbès et Solier: *Mémoire sur quelques points de la physiologie des Algues*, p. 11)
G. M. Smith: *Marine Algae of the Monterey Peninsula*, p. 128, Plate 20, Fig. 1.
Lighthouse Rocks, Santa Maria, Ponta Abril.

This is a widespread, occasional species of the Inhaca region. It occurs at low intertidal levels and in rock pools.

This plant is widespread on the south and east coasts of the Union. It also occurs at Camps Bay on the west coast of the Cape Peninsula as a locally common plant and in the Saldanha-Langebaan Lagoon region about 70 miles north of Cape Town. In the latter locality the plant was dredged up from a depth of about 12 feet. Both the Camps Bay and Langebaan records are new.

Hydroclathrus clathratus (Bory ex C. Ag.) Howe.
Sub-nom.
Fucus clathratus
Bory: Msct. in C. Agardh, *Spec. Alg.*, vol. 1, p. 412.
Hydroclathrus clathratus
(Howe: In Britton and Millspaugh, *The Bahama Flora*, p. 590)
Taylor: *Plants of Bikini*, p. 96.
Santa Maria, Ponta Abril, Lighthouse Rocks.

Plants collected in the Inhaca region measured up to about 1 dm. in diameter.

Recorded for Umpangazi on the northern coast of Natal. (Stephenson, 1947).

FUCALES

Hormophysa triquetra (L,) Kütz.
Kützing: *Phycologia generalis*, p. 359.
Santa Maria, Ponta Abril, Lighthouse Rocks.

The plants of *Hormophysa* collected correspond with *H. latifrons* as figured by Kützing (*Tabulae*, 10, Pl. 60). *H. latifrons* as figured by him is broader than his delineation of *H. triquetra* (Ibid.) which agrees with Turner's illustration of that species (Turner: *Fuci*, vol. 1, Plate 34). *H. latifrons* is also lacking in bladders which are represented as present in *H. triquetra*. Börgesen has dealt with the synonomy of this species (Börgesen, 1937) and maintains that *H. latifrons* is a form of *Hormophysa triquetra* which view is accepted in this paper.

Hormophysa triquetra is a common to frequent plant in deep low level pools in the Inhaca region and where found it is usually present in large numbers. Also it occurs at low intertidal levels on rock where it may be completely uncovered at low water of spring tides.

The plant has been collected by me in rock pools at Isipingo on the Natal coast. It has not, however, been observed as a common plant on the east coast of the Union. The Isipingo material collected agrees morphologically with the Inhaca plants (Plate XLII). It may be noted that Papenfuss (1943) suggested that *Hormophysa triquetra* should be excluded from the South African flora as it had not been collected there in recent years. The previous inclusion of this species in the South African seaweed flora was chiefly based on Linnaeus' type specimen.

Turbinaria ornata J. Ag.
J. G. Agardh: *Spec. Gen. et Ord. Algarum*, vol. 1, p. 266.
Kütz: *Tab. Phyc.*, vol. 10, p. 24, Pl. 66 (1).
Taylor: *Plants of Bikini*, p. 101.
Lighthouse Rocks, Ponta Abril.

This species occurs in pools and also emersed at low intertidal levels. At Ponta Abril and the Lighthouse Rocks it was observed to be locally very common in shallow water in small pools on rocky platforms (Plate XLIII).

Turbinaria ornata occurs on the coast of Natal.

Taylor (1950) states that this species attains heights of 3 dm. on Bikini. The plants seen on the coasts of Natal and at Inhaca are smaller and have not been found to attain heights exceeding one dm.

FLORIDEAE

NEMALIONALES

Galaxaura tenera Kjellm.
(Kjellman: *Galaxaura*, p. 77, Pl. 14 and 20)
Kylin: "Rhodophyceen von Südafrika", p. 5, Pl. 1, Fig. 2.
Lighthouse Rocks, Ponta Abril.

This plant was found as an occasional species in rock pools at low intertidal levels.

It is widely distributed on the coast of Natal and on the east coast of the Cape Province.

GELIDIALES

Gelidiopsis rigida (Vahl) Web. v. Bosse.
Sub-nom.
Fucus rigidus
(Vahl: *Naturh. Sellsk. Skrift*, 1802)

Echinocaulon spinellum, E. ramelliferum, E. rigidum.
Kütz: *Tab. Phyc.* vol. 18, Pl. 38, 39 and 40 respectively.
Gelidiopsis rigida
(Weber van Bosse: *Recueil de trav. bot. Neerl.*, vol. 1, p. 104).
Weber van Bosse: *Algues du Siboga*, IV, p. 427.
Ponta Abril, Santa Maria, Lighthouse Rocks.

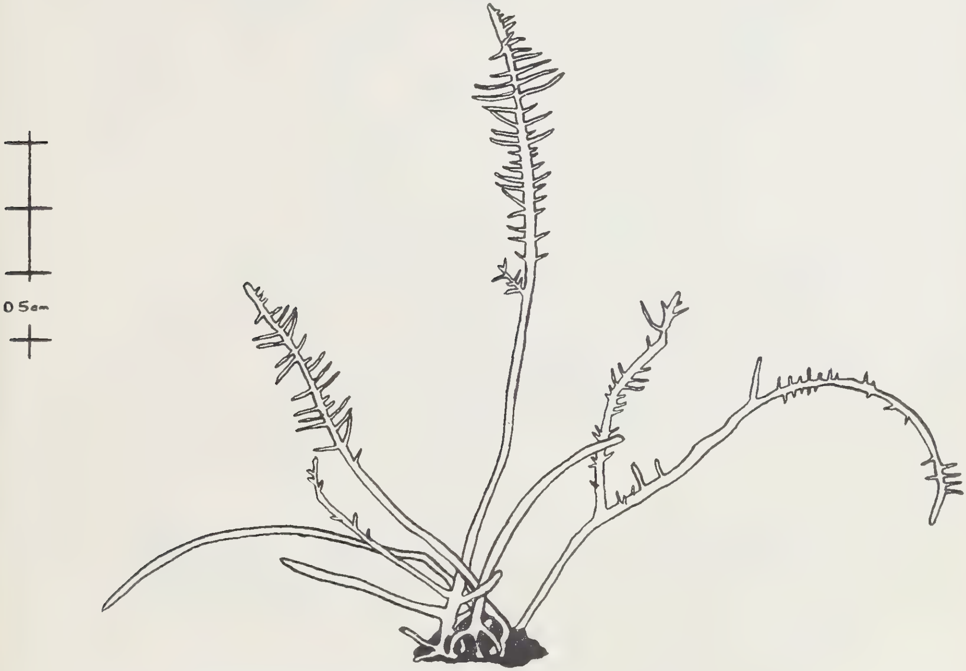

Fig. 15.—*Gelidiopsis rigida* (Vahl) W. v. B. (Santa Maria: B. 291)

The specimens of this plant (Fig. 15) collected in the Inhaca region agree well with material of the species in the British Museum of Natural History and with the material in the herbarium at Kew.

In the British Museum there are specimens of this species from Dar-es-Salaam, the Persian Gulf and Mauritius.

Gelidium caespitosum Kylin.
Kylin: "Rhodophyceen von Südafrika", p. 8, Fig. 2, E—H.
Ponta Punduini.

Plants from Inhaca are depicted in Fig. 16 which on comparison with Kylin's figures will be seen to come within the range of variation of the species.

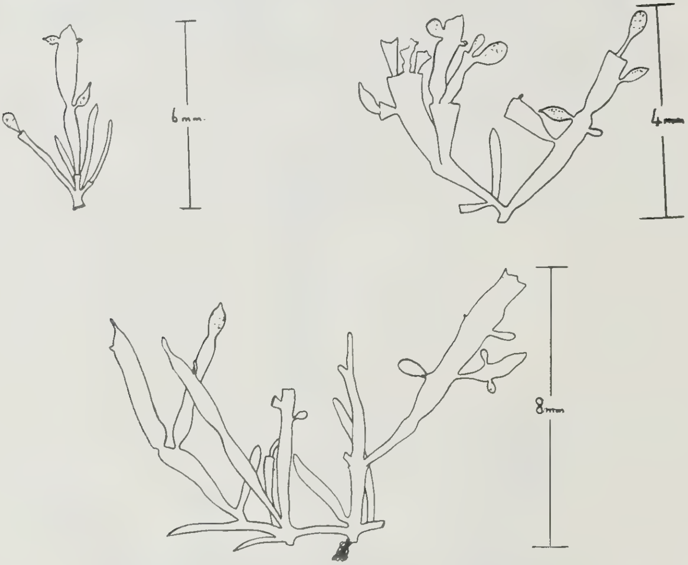

Fig. 16.—*Gelidium caespitosum* Kylin (Ponta Punduini: B. 189).

The type locality of the species is Isipingo but it has been collected by me also at other localities in the Durban area: at Reunion Rocks about 9 miles south, and at Salt Rock about 35 miles north, of Durban.

Gelidium reptans (Suhr) Kylin.
Sub-nom.
Phyllophora reptans
von Suhr: "Beiträge zur Algenkunde", p. 13, Plate 3, Fig. 10.
Gelidium reptans
Kylin: "Rhodophyceen von Südafrika", p. 6, Fig. 2, A—C.
Ponta Abril, Lighthouse Rocks.

Some of the plants collected show a certain amount of irregularity of the margin while other plants correspond very closely with Kylin's drawings (Fig. 17). The former agree more in this respect with von Suhr's figure.[1]

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[1] In regard to Suhr's figure see Börgesen, 1943, p. 6.

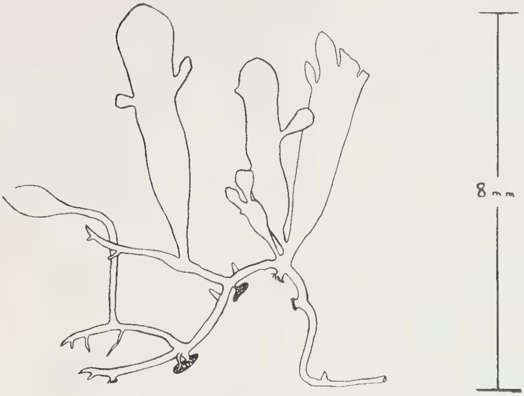


Fig. 17.—*Gelidium reptans* (Suhr) Kylin. (Ponta Abril: B. 248).

At Inhaca this alga is chiefly found at mid-tide levels and occurs commonly on the shells of animals—*Patella barbara* and *Tetraclita serrata*.

Gelidium reptans occurs on the coast of Natal and on the east coast of the Cape Province. In a northward direction on the east coast of the Union it progressively replaces *Gelidium pristoides* as the commonest species of *Gelidium* at mid-tide levels.

GIGARTINALES

Plocamium glomeratum J. Ag.
J. Agardh: *Spec. Gen. et Ord. Algarum*, vol. II, Part 2, p. 397.
Kylin: "Rhodophyceen von Sudafrika", Pl. 3, Fig. 7.
Ponta Abril, Lighthouse Rocks.

This is a common and widespread species at low intertidal levels. It was found in both sandy and rocky habitats.

Stephenson (1947) records the species as extending as far south west as Port Elizabeth but adds: "probably farther west also" (p. 307). The present author has collected well developed plants as far west as Tergniet, near Mossel Bay.

RHODYMENIALES

Champia compressa Harv.
Harvey: *Genera of South African Plants*, 1st Ed., p. 402.
Harvey: *Nereis Australis*, p. 78, Pl. 30.

Santa Maria, Ponta Abril, coral reef on west coast north of laboratory.

Only a few specimens of this beautiful alga were found.

The species is widely distributed on the coasts of the Union. Stephenson (1947) gives its range as from Port St. Johns to Oudekraal, which is near Cape Town. The present writer has dredged up the species from a depth of about 15 feet about 70 miles north of Cape Town in the Langebaan Lagoon. He has also collected it at Isipingo and Salt Rock on the Natal coast thus extending its recorded distribution on both the east and west coasts.

Corallopsis opuntia J. Ag.

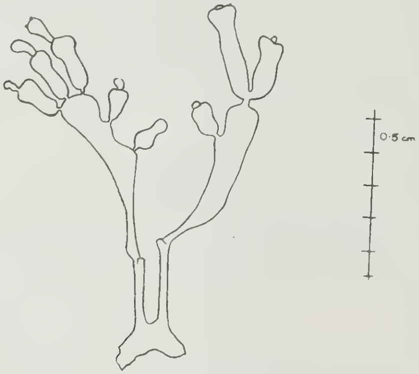
J. G. Agardh: *Spec. Gen. et Ord. Algarum*, vol. 3, Part 1, p. 409.

De-Toni: *Sylloge Algarum*, vol. 4, sec. 2, p. 459.

Ponta Abril, Santa Maria, Lighthouse Rocks.

Material of this species (Fig. 18) was identified as *Corallopsis opuntia* by Miss C. Dickinson of Kew.

Common in rock pools (especially in the presence of sand) and at low intertidal levels.



Ponta Abril 22nd July 1956

Fig. 18.—*Corallopsis opuntia* J. Ag. (Ponta Abril).

Rhodymenia natalensis Kylin

Kylin: "Rhodophyceen von Südafrika", p. 13, Pl. 5, Fig. 13.

Ponta Abril, Lighthouse Rocks.

The plants examined consisted of a horizontal creeping portion attached to the substratum at intervals and of erect fronds, 3—6 cms. high, slender, showing fairly regular dichotomous branching and of a somewhat crinkled appearance. The plants in their living condition were of a greenish colour.

The plants were tetrasporic, the tetrasporangia occurring in expanded, spoon-like branch tips.

The internal structure and tetraspores agreed exactly with the corresponding features of specimens of the species from Durban named by Kylin. As Kylin does not figure a section of the tetrasporangial region in his paper an illustration is included here (Fig. 19). The outer

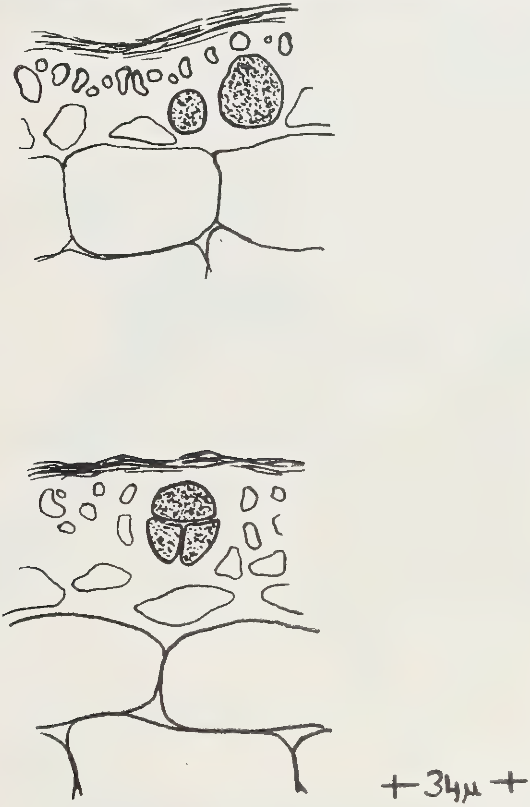


Fig. 19.—*Rhodymenia natalensis* Kylin. Sections showing young and more mature tetrasporangia.

region of the thallus in which the tetrasporangia occur has cells with thick mucilaginous walls and this region bounds an inner region of large cells with relatively thin cell walls.

On the coasts of Inhaca this species occurs at low intertidal levels.

Rhodymenia natalensis is a widespread species on the east and south coasts of the Union. On the east coast it is locally a prominent plant on vertical rock faces at about low water level of spring tides.

CERAMIALES

Amansia glomerata C. Ag.

Agardh, C. A: *Systema Alg.*, p. 247.
Agardh, J. G: *Spec. Gen. et Ord. Algarum*, vol. 2, Part 3, p. 1111.
Falkenberg, P.: *Rhodomelaceen.* p. 416, Pl. 1, Figs. 20—21, Pl. 6, Figs. 14—29.
Sub-nom. *A. fasciculata.*
Kütz: *Tab. Phyc.*, vol. 15, Pl. 4, Fig. a—d.
Ponta Abril, Santa Maria, Lighthouse Rocks.

Plants collected at Inhaca (Fig. 20) agree well with most of the specimens of this species in the British Museum. That collection includes plants from Dar-es-Salaam and Mombasa on the east coast of Africa as well as plants from Mauritius from which island it has also been recorded by Börgesen (1945, p. 43).

Bostrychia binderi Harv.

Harvey: *Nereis Australis*, p. 68, Pl. 28.
Joly: "Bostrychia in Southern Brazil", p. 61.

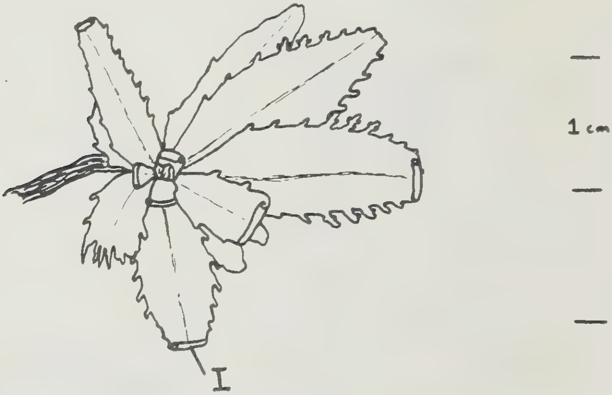


Fig. 20.—One rosette of *Amansia glomerata* C. Ag. (Lighthouse rocks. B. 266). I. = inrolled apex.

Ponta Punduini, Saco, Lighthouse Rocks, Ponta Abril, west coast of island.

This plant grows abundantly in sheltered, shaded, rocky habitats at high intertidal levels. It also occurs on the lowest parts of *Rhizophora*. *Bostrychia binderi* grows on the Natal coast.

Digenea simplex (Wulf.) C. Ag.
Sub-nom.
  Conferva simplex.
    (Wulfen: *Cryptogama Aquatica*, p. 17)
  Digenea simplex.
    C. A. Agardh: *Spec. Alg.*, p. 389.
    J. G. Agardh: *Spec. Gen. et Ord. Algarum*, vol.2, Part 3, p. 845.
    Falkenberg: *Rhodomelaceen*, p. 159, Pl. 9, Figs. 25—29.
    Börgesen: *Marine Algae Danish West Indies*, Part 4, p. 281.
Ponta Abril, Lighthouse Rocks, Santa Maria.

This species (Fig. 21) was found in low level rock pools.

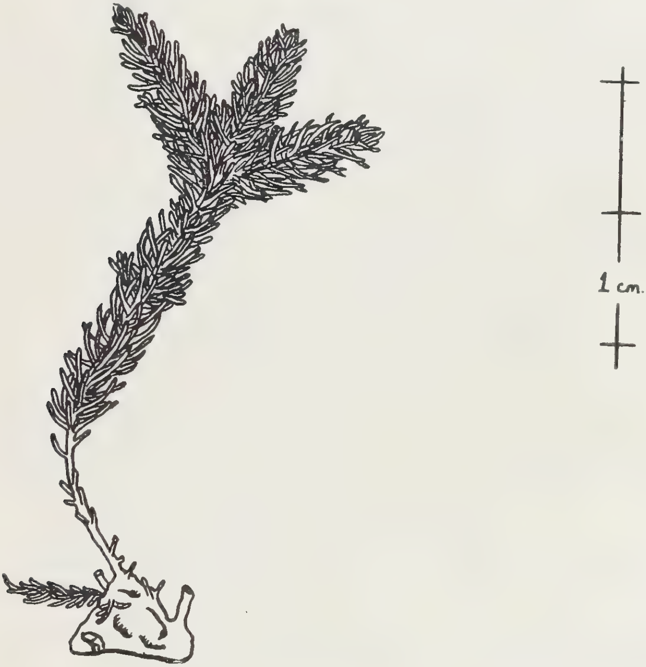


Fig. 21..—*Digenea simplex* (Wulf) C. Ag. (Ponta Abril: B. 272).

Kützingia natalensis J. Ag.

J. Agardh: *Spec. Gen. et Ord. Algarum*, vol. 2, Part 3, p. 1099.
Lighthouse Rocks, Ponta Abril.

The characters of this species including the inrolled axis apices are shown in Fig. 22.

Kützingia natalensis occurs in low intertidal level rock pools and at low water level of spring tides. It is a widespread species.

It occurs on the coast of Natal and on the east coast of the Cape Province.

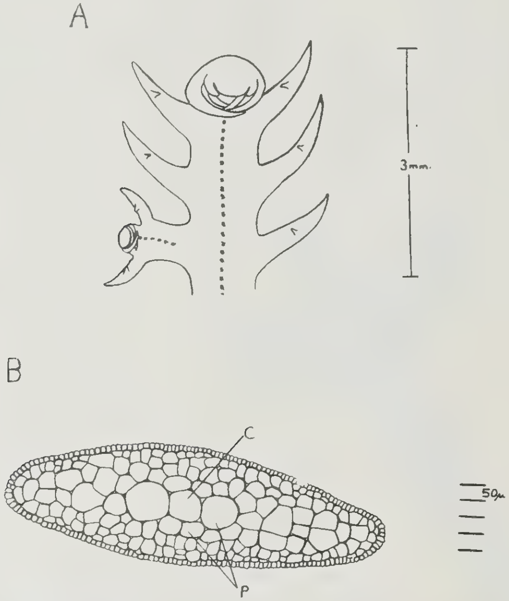


Fig. 22.—*Kützingia natalensis* J. Ag. (Lighthouse rocks B. 295). A. = Apex of branch. B. = Transverse section of axis: c. = central cell. p. = Pericentral cells.

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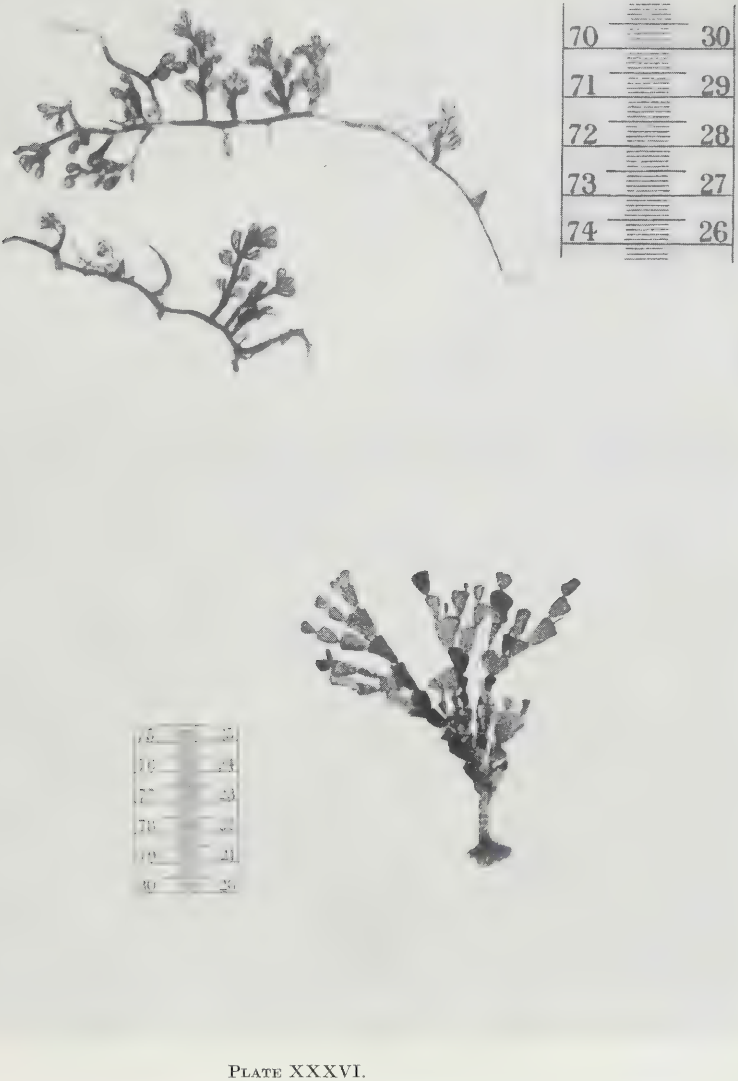


Plate XXXVI.
Above (A): *Caulerpa racemosa* (Forssk) W. v. B., var. *clavifera* (Turn.) W. v. B. f. *macrophysa*.
Below (B): *Halimeda cuneata* Hering.

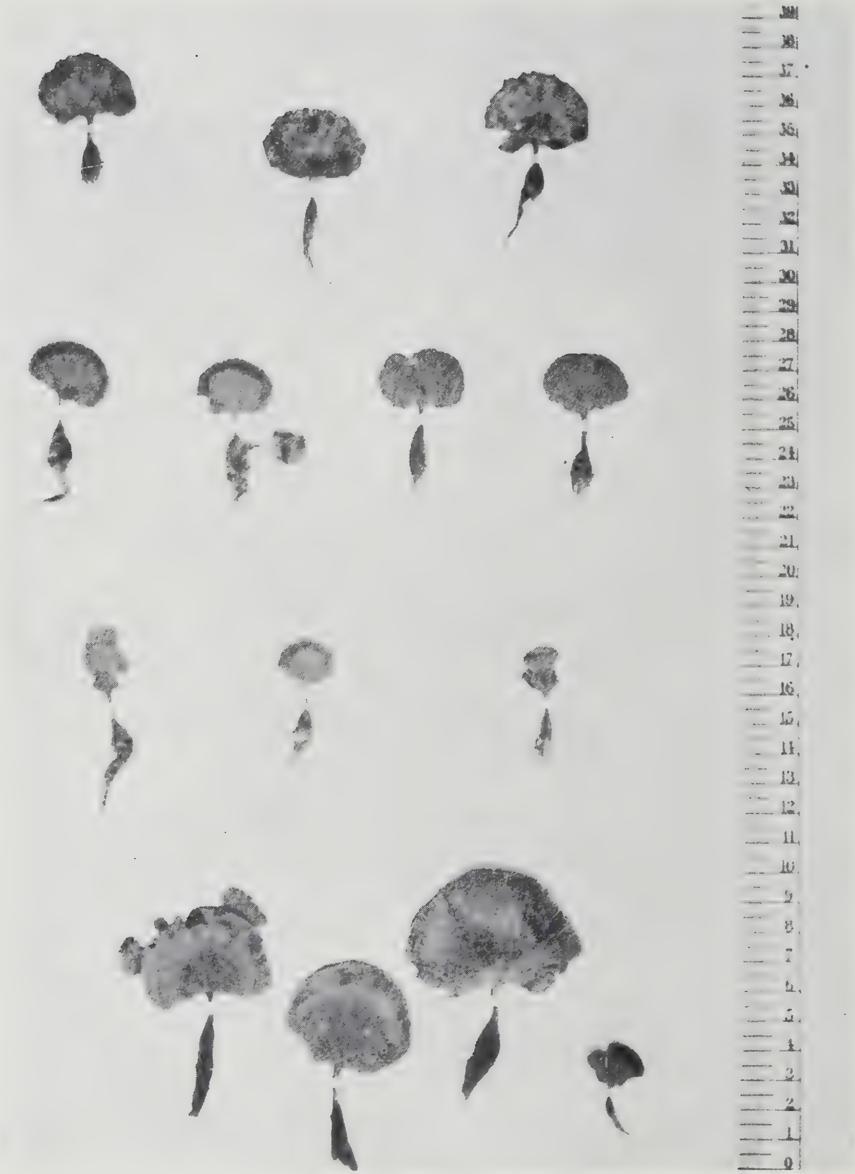


PLATE XXXVII. *Udotea orientalis* A. and E. S. Gepp.
Range of form and size.

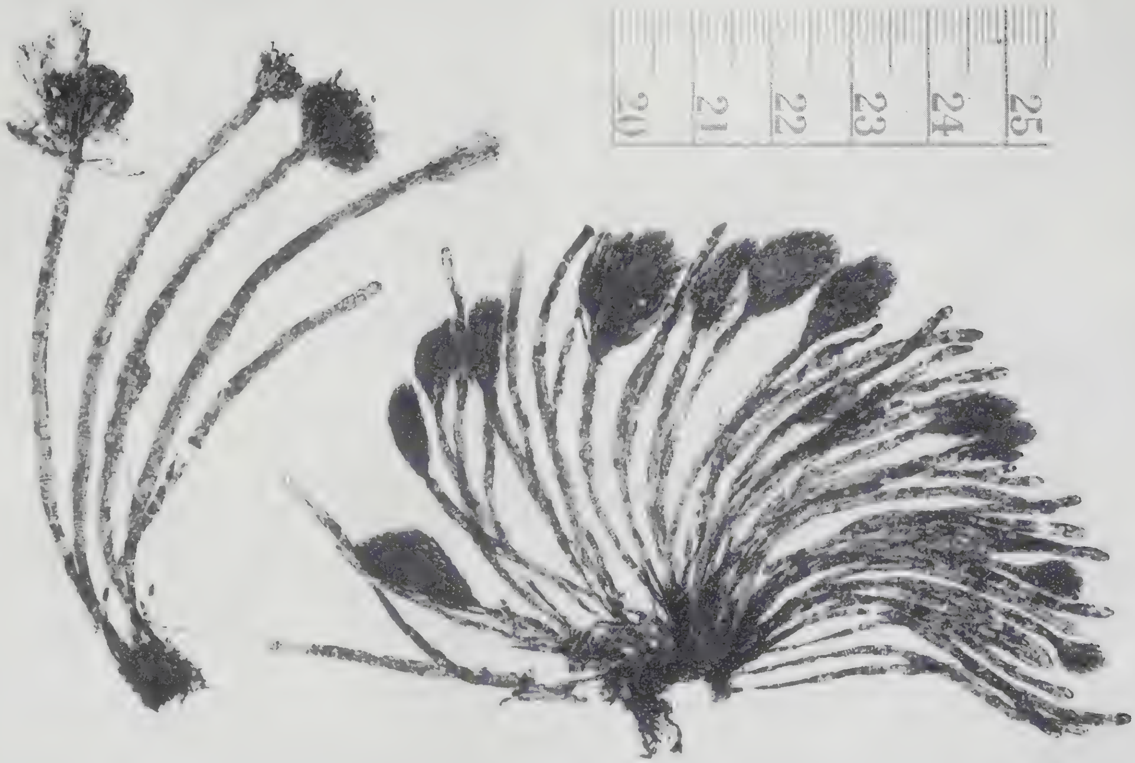


Plate XXXVIII. *Chamaedoris delphinii* (Hariot) Feld. et Börg

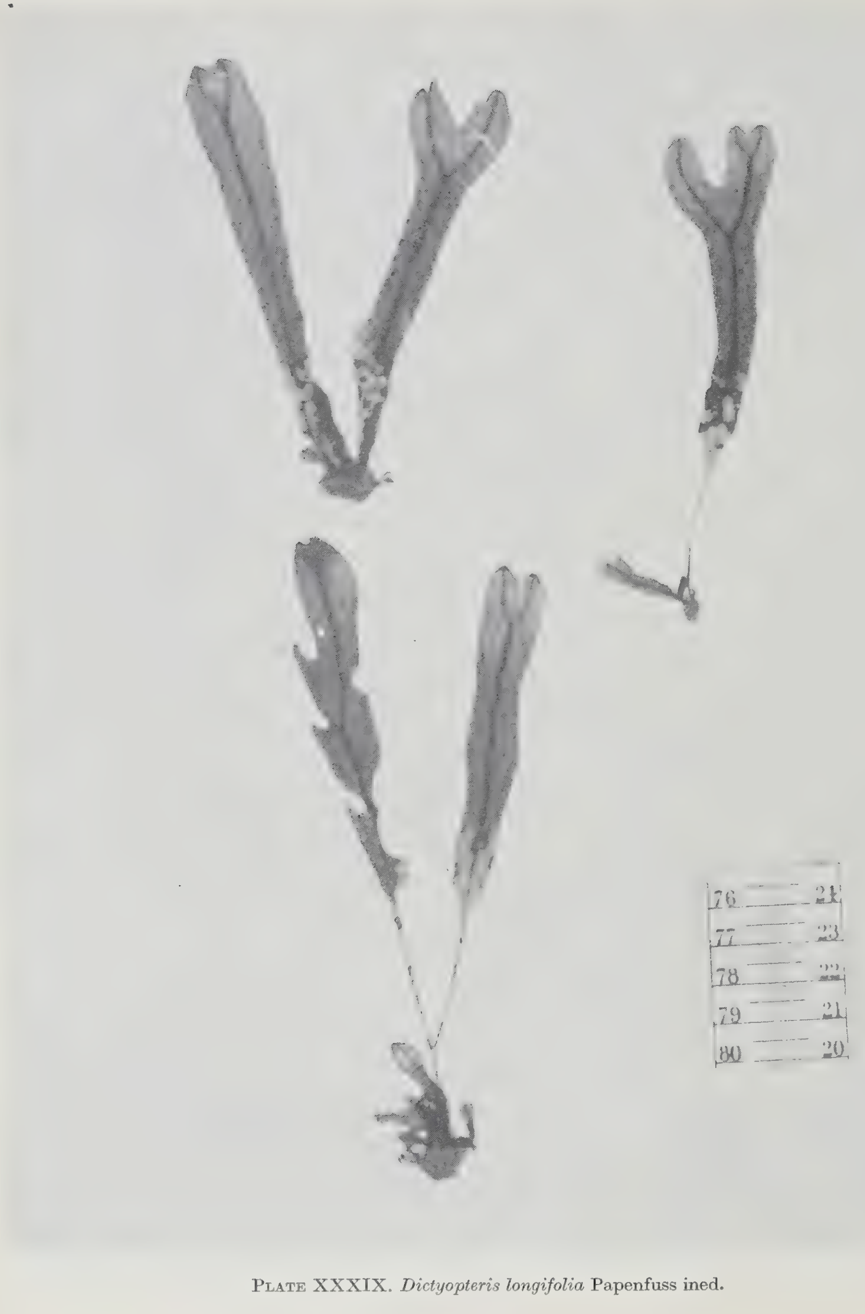


PLATE XXXIX. *Dictyopteris longifolia* Papenfuss ined.

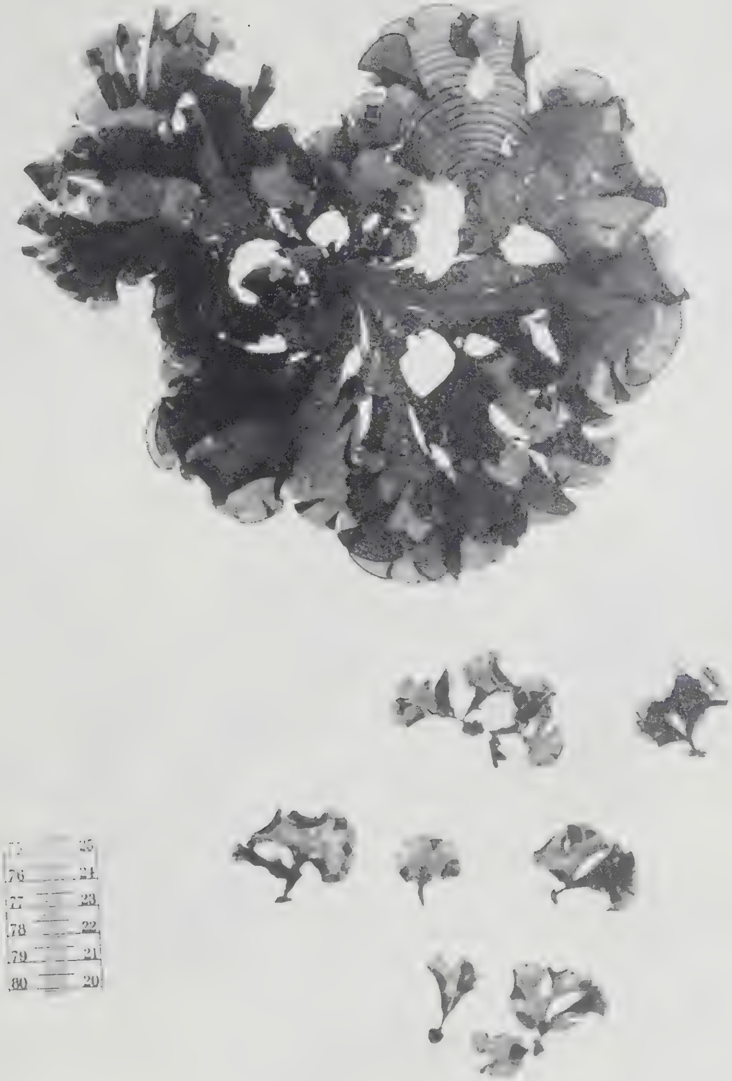
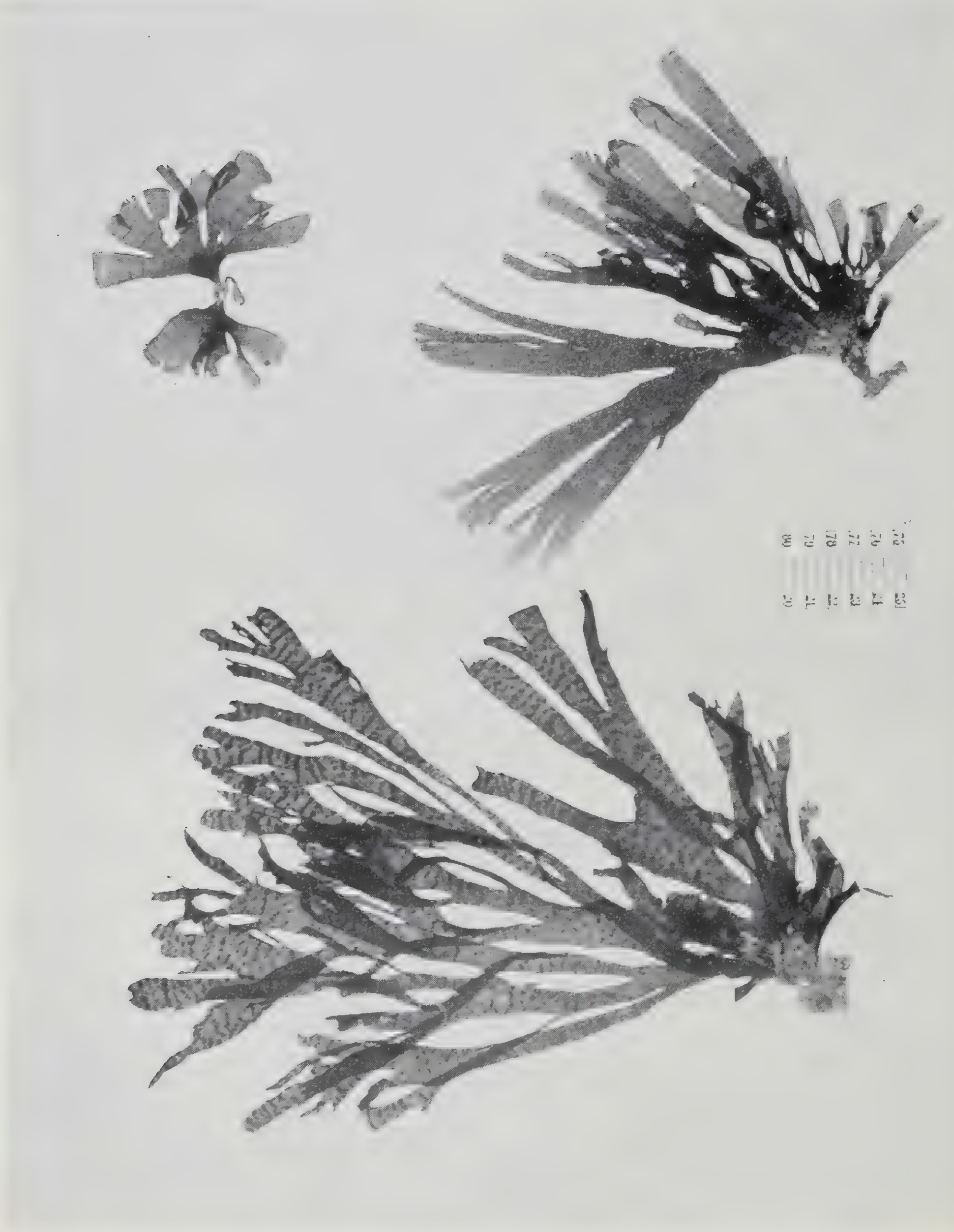


PLATE XL. *Padina commersonii* Bory.
Above, from sand in quiet waters; Ponta Punduini.
Below, attached to rock and exposed to rougher seas: Santa Maria.



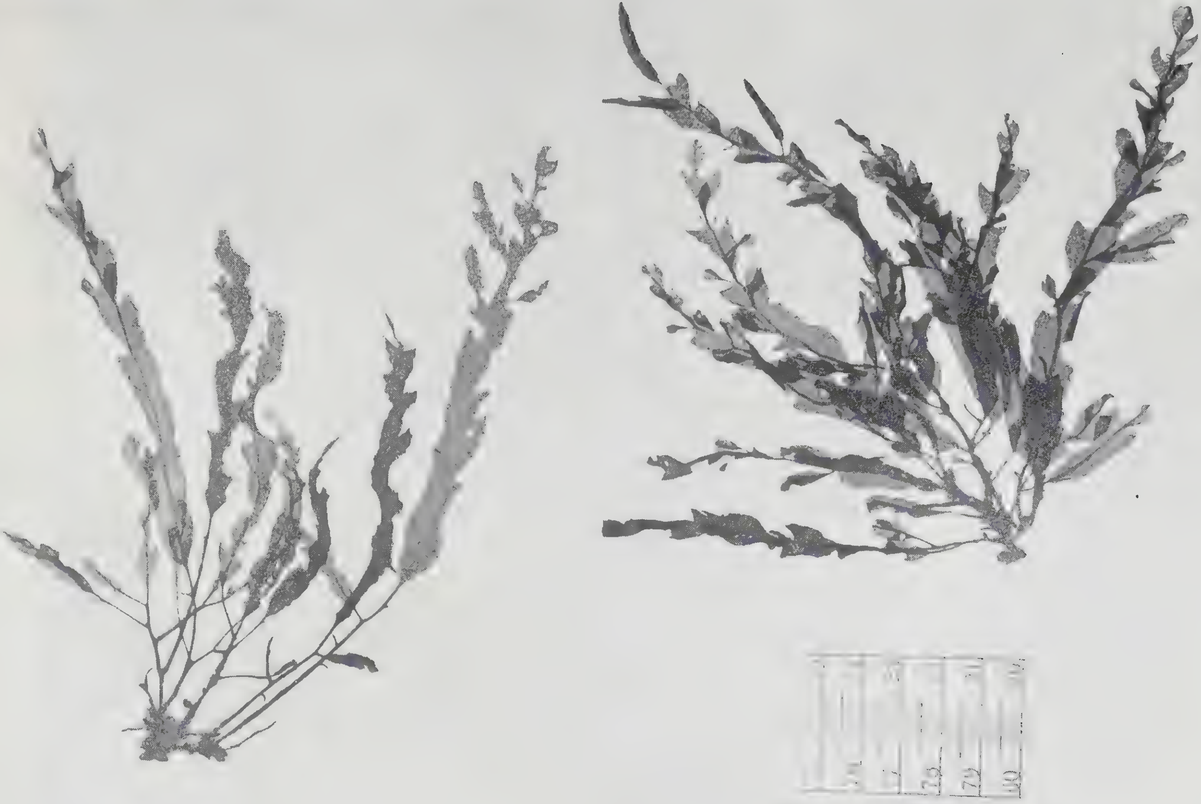


Plate XLII. *Hormophysa triquetra* (L.) Kütz.
On left, from Santa Maria.
On right, from Isipingo (nr. Durban) Natal.

Plate XLIII. *Turbinaria ornata* J. Ag.
Rocky platform, Ponta Abril.